

Important Advances in Clinical Medicine

Epitomes of Progress—Ophthalmology

The Scientific Board of the California Medical Association presents the following inventory of items of progress in Ophthalmology. Each item, in the judgment of a panel of knowledgeable physicians, has recently become reasonably firmly established, both as to scientific fact and important clinical significance. The items are presented in simple epitome and an authoritative reference, both to the item itself and to the subject as a whole, is generally given for those who may be unfamiliar with a particular item. The purpose is to assist the busy practitioner, student, research worker or scholar to stay abreast of these items of progress in Ophthalmology which have recently achieved a substantial degree of authoritative acceptance, whether in his own field of special interest or another.

The items of progress listed below were selected by the Advisory Panel to the Section on Ophthalmology of the California Medical Association and the summaries were prepared under its direction.

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Senile Macular Degeneration

SENILE MACULAR DEGENERATION (SMD) is the leading cause of reduced visual acuity, and occurs particularly in older persons. In the Model Reporting Area (MRA) of the United States, SMD accounted for 19 percent of all newly reported cases of blindness. In Great Britain, SMD is the cause of 25 percent of all newly reported cases of blindness, and its prevalence with age is most impressive in that SMD accounts for only 1 percent of the causes of blindness in people less than 60 years of age, but 36 percent of those over 70 years of age.

The macula is the very specialized portion of the central retina. It is responsible for fine discriminating visual acuity. In fact, acuity better than 20/200 is achieved only by the macula. "Form vision" is obtained from the peripheral retina. The most frequently observed clinical finding in an eye with SMD is hypopigmentation of varying appearance in the macula. These pigmentary alterations can be so subtle as to be at the limit of resolution even with the magnification provided by the slit lamp biomicroscope and fluorescein angiography. If progression is charac-

terized by hypopigmentation only, then the resulting appearance may be similar to geographic atrophy. Fluorescein angiography has been particularly helpful in distinguishing such atrophic types from a more exudative type characterized by hemorrhage, serous exudation and cicatrization. Serous detachments of the retinal pigment epithelium (RPE) may change within hours, but it is more common for those lesions to gradually evolve over several months. The appearance of a grey-green mound in the previously hypopigmented area is a poor prognostic sign since this is related to subretinal neovascularization and hemorrhage. This neovascular tissue is the source of abnormal leakage, which can lead to serous detachment of the sensory retina or RPE, or both. In addition, hemorrhage and subretinal lipid may be the early manifestations of such subretinal neovascularization. The macular lesion may take a rounded or so called "disciform" shape with the development of cicatrization. Since SMD may masquerade as an intraocular tumor, some eyes have been obtained for histopathologic correlation. The histopathology is correlated with fluorescein angiographic findings to provide the basis

for the hypothesis of Gass and others regarding the pathogenesis of SMD.

The role of therapy, particularly photocoagulation, whether xenon-arc or argon laser, has been the subject of much interest and controversy. Photocoagulation therapy is directed toward elimination of serous detachments or the eradication of the abnormal subretinal neovascular network. This therapy must be applied before involvement of the vascular free zone (the center of the macula), or else the scar from therapy will be as detrimental to the patient as that from the disease. In general, the results of such therapy have not been encouraging, since in many cases the disease process is already too far advanced at the time of therapy. In reported series, the various forms of therapy have been said to yield success rates varying from 18 to 43 percent. These series are greatly biased by the criteria for therapy of the different investigators. All authors agree that no statistically significant conclusions can be drawn since no double-blind study has been done. A study currently in progress suggests that this therapy is of value in holding the patient's vision at the same level as at the time of photocoagulation, whereas the untreated controls undergo subsequent deterioration of vision.

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Visual Field Testing

THE MOST IMPORTANT ADVANCES in visual field testing that have occurred within the lifetimes of today's practicing physicians can be attributed to the efforts of Goldmann, Harms and Aulhorn. Recognizing certain inherent limitations in quantifying the variables of tangent screen perimetry, Goldmann sought to improve upon that technique by building a hemispheric dome-shaped perimeter according to precise specifications. With this device, accurate patient fixation is fully monitored through a telescopic viewing device which the perimetrist uses throughout the testing procedure. In addition, the illumination is accurately determined by frequent calibration of the single

bulb which, by means of filters, is projected for dual use as the target as well as the background light source. Additional neutral density filters are also used to vary the target luminance so that the intensities of different presenting targets have a constant relationship to each other that may be as small as 0.1 log unit difference. This perimeter also has the advantage of employing variable target sizes which intermix with the luminance levels to provide even more combinations of stimuli than can be achieved by intensity variation alone yet they maintain a precise mathematical separation between each setting. Another convenience of this machine is the pantographic arm which moves the target location throughout the dome and allows exact point-for-point notation on the visual field paper being marked by the perimetrist. A number of copies of this instrument made by different manufacturers are now available but none surpass the original concept.

Although this perimeter greatly improved the reliability of kinetic perimetry, complete static perimetry (an even more sensitive measure of the visual island) remained too cumbersome to carry out, even with Goldmann's device. The reason for this difficulty is the need to present many levels of target illumination at a large number of testing points during the examination. The rapid manipulation of at least three filter levers, which is necessary to achieve the proper combinations, is just too complicated when done manually. Harms and Aulhorn recognized this problem and produced an instrument with automated filters which are moved by a hand-held control box. The successful introduction of this improvement over Goldmann's original design has permitted ultimate precision in visual field testing and has already increased the depth of existing knowledge on the subject of visual field abnormalities. Because of these perimeters, the ability of the physician to separate the stage of ocular hypertension without scotomata from the onset of glaucomatous field damage has finally achieved a level of accuracy in which he can be fully confident.

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